MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

PBM0054 – MATHEMATICS

(Foundation in Business)

20 OCTOBER 2018
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 3 pages with **FIVE** questions.
2. Attempt **ALL** five questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

Question 1

a Simplify the expression $\dfrac{\dfrac{3}{x+2}-4}{\dfrac{2}{x+2}+1}$. (3 marks)

b. Simplify the expressions. Leave your answers in surd form $\left(\sqrt{\ }\right)$.

i. $\sqrt[3]{16x^4}-2\sqrt[3]{128x^4}$ (3 marks)

ii. $3\sqrt{27x}-4\sqrt{48x}+2\sqrt{3x}$ (3 marks)

c. Rationalize the denominator for $\dfrac{\sqrt{5}}{\sqrt{2}+\sqrt{3}}$. (3 marks)

d. Find the value of x in the following equation:

$$2^{-3x-9}=\sqrt{64^{(2x+3)}}$$ (4 marks)

e. Given $(2r,3k)$ is the solution for simultaneous equation of $3x-4y=12$ and $3x^2+8y^2=10xy$. Find the values of r and k.

(6 marks)

f. Find the vertex of the parabola with an equation $y=x^2-2x-3$. (3 marks)

(Total = 25 marks)

Question 2

a. Solve for

i. $\log_3(2x-1)=2$ (2 marks)

ii. $\log(7x-3)+2\log 5=2+\log(x+3)$ (5 marks)

b. Use the substitution $u=3^x$ to solve the equation $3(3^x)+\dfrac{3^2}{3^x}=28$. (5 marks)

(Total = 12 marks)

Continued...

Question 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$\begin{aligned} 2x+4z &= 1-3y \\ 4x+3y+3 &= -z \\ x+2y &= 3-4z \end{aligned}$$

(13 marks)

(Total = 13 marks)

Question 4

a. Differentiate the following functions with respect to x. Simplify the answers.

i. $y = -4x^3 - \dfrac{x}{3x^5} + \dfrac{5}{\sqrt[5]{x^{10}}} - 2$ (3 marks)

ii. $y = 2\left(\sqrt[3]{x^2-4}\right)^{3/2}$ (3 marks)

iii. $y = \dfrac{3x^3-5}{(2x-1)^4}$ (5 marks)

b. Given the curve $y = \dfrac{6}{x}$.

i. Find the gradient, $\dfrac{dy}{dx}$ for this curve. (1 mark)

ii. Find 2 points on the lines which are tangent to the curve and are parallel to the line $6x+4y-5=0$. (5 marks)

iii. Hence, find the **equations** of these tangent lines. (4 marks)

c. If $y=(2t)^3$ and, $t=\sqrt{x}$, find $\dfrac{dy}{dx}$. (4 marks)

(Total = 25 marks)

Continued...

Question 5

a. Integrate each of the following integral.

i. $\int \frac{1}{4}x^{-2}\left(x^2 - \frac{5}{\sqrt[3]{x^2}} + \frac{1}{2\sqrt{x}}\right) dx$ (5 marks)

ii. $\int \frac{8x^6 - 125}{(2x^2 - 5)} dx$ (5 marks)

iii. $\int_0^1 5x\sqrt{x^2 + 3}\ dx$ (7 marks)

b. A firm has the marginal profit function of

$$\frac{dP}{dx} = \frac{9000 - 3000x}{(x^2 - 6x + 10)^2}.$$

Find the total profit function, $P(x)$ given that $P(x) = 1500$ at $x = 4$. (8 marks)

(Total = 25 marks)

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